What is claimed is:

- 1 1. An electrostatic discharge device, comprising:
- 2 M pieces (M is an integer of two or more) of first well
- 3 regions formed on a main surface of a semiconductor substrate
- 4 of one conduction type, the first well regions being of a
- 5 conduction type reverse thereto; and
- a second well region of the one conduction type, the second
- 7 well region being formed between the first well regions adjacent
- 8 to each other,
- 9 wherein each of the M pieces of first well regions includes
- 10 a first diffusion region of the reverse conduction type, and
- 11 a second diffusion region of the one conduction type, both of
- 12 which are formed therein, and at least one of a plurality of
- 13 the second well regions includes a third diffusion region of
- 14 the one conduction type, which is formed therein, and
- the first diffusion region in a j-th (j is an integer that
- 16 satisfies: $1 \le j \le (M-1)$) of the first well region is connected to
- 17 the second diffusion region in a (j+1) -th of the first well region,
- 18 the second diffusion region in the first well region at the first
- 19 position is connected to a first terminal, the first diffusion
- 20 region in an M-th of the first well region is connected to a
- 21 second terminal, and the first terminal is connected to either
- one of desired terminal to be protected and discharge terminal,
- 23 and the second terminal is connected to the other,
- 24 wherein the second well region is formed of a single region
- 25 between the first well regions adjacent to each other, and the
- 26 third diffusion region is divided into a plurality of regions
- 27 spaced from one another between the first well regions adjacent
- 28 to each other.

- 1 2. An electrostatic discharge device, comprising:
- 2 M pieces (M is an integer of two or more) of first well
- 3 regions formed on a main surface of a semiconductor substrate
- 4 of one conduction type, the first well regions being of a
- 5 conduction type reverse thereto; and
- 6 a second well region of the one conduction type, the second
- 7 well region being formed between the first well regions adjacent
- 8 to each other,
- 9 wherein each of the M pieces of first well regions includes
- 10 a first diffusion region of the reverse conduction type, and
- 11 a second diffusion region of the one conduction type, both of
- 12 which are formed therein, and at least one of a plurality of
- 13 the second well regions includes a third diffusion region of
- 14 the one conduction type, which is formed therein, and
- the first diffusion region in a j-th (j is an integer that
- satisfies: $1 \le j \le (M-1)$) of the first well region is connected to
- 17 the second diffusion region in a (j+1)-th of the first well region,
- 18 the second diffusion region in the first well region at the first
- 19 position is connected to a first terminal, the first diffusion
- 20 region in an M-th of the first well region is connected to a
- 21 second terminal, and the first terminal is connected to either
- 22 one of desired terminal to be protected and discharge terminal,
- 23 and the second terminal is connected to the other,
- 24 wherein the second well region is divided into a plurality
- of regions spaced from one another between the first well regions
- 26 adjacent to each other.
 - 1 3. An electrostatic discharge device, comprising:
 - M pieces (M is an integer of two or more) of n-type first

- 3 well regions formed on a main surface of a p-type semiconductor
- 4 region; and
- 5 a p-type second well region formed between the first well
- 6 regions adjacent to each other,
- 7 wherein each of the M pieces of first well regions includes
- 8 an n-type first diffusion region, and a p-type second diffusion
- 9 region, both of which are formed therein, and at least one of
- 10 a plurality of the second well regions includes a p-type third
- 11 diffusion region formed therein, and
- 12 the first diffusion region in a j-th (j is an integer that
- 13 satisfies: $1 \le j \le (M-1)$) of the first well region is connected to
- 14 the second diffusion region in a (j+1)-th of the first well region,
- 15 the second diffusion region in the first well region at the first
- 16 position is connected to a first terminal, the first diffusion
- 17 region in an M-th of the first well region is connected to a
- 18 second terminal, and the first terminal is connected to either
- one of desired terminal to be protected and discharge terminal,
- 20 and the second terminal is connected to the other.
- 1 4. The electrostatic discharge device, according to claim 1,
- wherein the one conduction type is p type.
- 1 5. The electrostatic discharge device, according to claim 3,
- wherein the third diffusion region is formed only in the
- 3 second well region formed between the highest potential first
- 4 well region that is the first well region at the first position,
- 5 which includes the second diffusion region connected to the first
- 6 terminal, and the first well region adjacent thereto.
- 1 6. An electrostatic discharge device, comprising:

- 2 M pieces (M is an integer of two or more) of first well
- 3 regions formed on a main surface of a semiconductor substrate
- 4 of one conduction type, the first well regions being of a
- 5 conduction type reverse thereto; and
- 6 a second well region of the one conduction type, the second
- 7 well region being formed between the first well regions adjacent
- 8 to each other,
- 9 wherein each of the M pieces of first well regions includes
- 10 a first diffusion region of the reverse conduction type, and
- 11 a second diffusion region of the one conduction type, both of
- 12 which are formed therein, and at least one of a plurality of
- 13 the second well regions includes a third diffusion region of
- 14 the one conduction type, which is formed therein, and
- the first diffusion region in a j-th (j is an integer that
- 16 satisfies: $1 \le j \le (M-1)$) of the first well region is connected to
- 17 the second diffusion region in a (j+1)-th of the first well region,
- 18 the second diffusion region in the first well region at the first
- 19 position is connected to a first terminal, the first diffusion
- 20 region in an M-th of the first well region is connected to a
- 21 second terminal, and the first terminal is connected to either
- one of desired terminal to be protected and discharge terminal,
- 23 and the second terminal is connected to the other.
 - 7. The electrostatic discharge device according to claim 5,
 - 2 wherein each of the second well region and the third
- 3 diffusion region is formed of a single region between the first
- 4 well regions adjacent to each other.
- 1 8. The electrostatic discharge device according to claim 1,
- wherein the M is a minimum n satisfying:

- $3 \qquad |Vx| < n \times |Vf|$
- where, during a normal operation, Vx and If are a maximum
- 5 voltage to be applied to the desired terminal to be protected
- 6 and discharge terminal and a rated value of a maximum leak current
- 7 allowable therebetween, respectively, Vf is a potential
- 8 difference between the first well region and the second diffusion
- 9 region when a current of a value If is flown to a diode formed
- 10 of the first well region and the second diffusion region in a
- 11 forward direction, and n is an arbitrary integer.
 - 9. The electrostatic discharge device according to claim 1,
 - wherein a shallow trench isolation region is provided
- 3 between the first diffusion region and the second diffusion
- 4 region.
- 1 10. The electrostatic discharge device according to claim 1,
- 2 wherein no insulating film is formed in an internal region
- 3 of the semiconductor substrate between the first diffusion region
- 4 and the second diffusion region, which are formed in the one
- 5 first well region.
- 1 11. The electrostatic discharge device according to claim 10,
- 2 wherein a predetermined electrode material film is formed
- 3 on the surface of the semiconductor substrate between the first
- 4 diffusion region and the second diffusion region, which are
- 5 formed in the one first well region, by interposing the insulating
- 6 film therebetween.
- 1 12. The electrostatic discharge device according to claim 1,
- wherein at least one of the third diffusion region is

- 3 coupled, by a metal wire, to a power supply wire at a predetermined
- 4 potential.